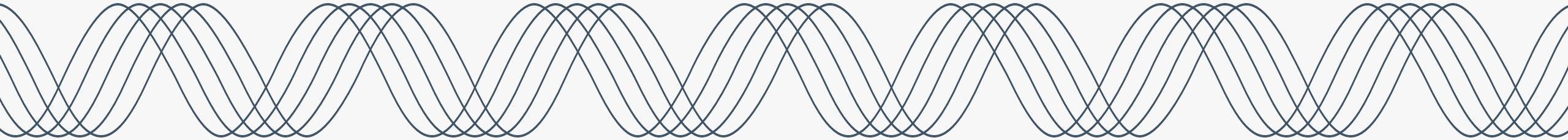
PGE CEP & IRP Roundtable 26-1

Jan 14th 2026



Meeting Details

1

Electronic version of presentation

https://portlandgeneral.com/about/who-we-are/resource-planning/combined-cep-and-irp/combined-cep-irp-public-meetings

2

Zoom meeting details

- Join Zoom Meeting https://us06web.zoom.us/j/84372774388?pwd=WGdNfwfAFGcWgHxYjX0Mk2QbhDDaa7.1
- Meeting ID: 843 7277 4388
- Passcode: 108198

3

Participation

- Use the raise the hand feature to let us know you have a question
- Unmute with microphone icon or *6

Meeting Logistics

Focus on Learning & Understanding

- There will be no chat feature during the meeting to streamline taking feedback
- Team members will take clarifying questions during the presentation, substantive questions will be saved for the end (time permitting)
- Attendees are encouraged to ‘raise’ their hand to ask questions

Follow Up

If we don’t have time to cover all questions, we will rely on the CEP/IRP feedback form

January 14, 2026 – Agenda

9:00 | Welcome

9:05 | PGE Longer Term Local Transmission Plan For the 2024-2025 Planning Cycle

9:30 | Resource Contract Extension Update

9:45 | Flexibility study overview

10:10 | Clean Energy Plan – Overview

10:35 | Community Benefit Indicators

11:00 | PGE'S Community Engagement Approach for 2026 CEP

11:15 | Portfolio/Scenarios Designs

11:50 | Closing Remarks - Next Steps

Upcoming Roundtable Schedule for the 2026 CEP/IRP

Wednesdays from 9 to 12 pm, Online Via Zoom

6	**February 24, 2026**	Flexibility study results, CEP emissions reductions
7	**April 08, 2026**	Draft portfolio analysis results
8	**May 20, 2026**	Updates prior to filing
	July 01, 2026	Office Hours after filing

8 Workshops Total

Topics noted here are subject to change

PGE Longer Term Local Transmission Plan For the 2024-2025 Planning Cycle

PGE Transmission Planning

Ian Beil
Manager Planning Transmission Engineering
Transmission Planning

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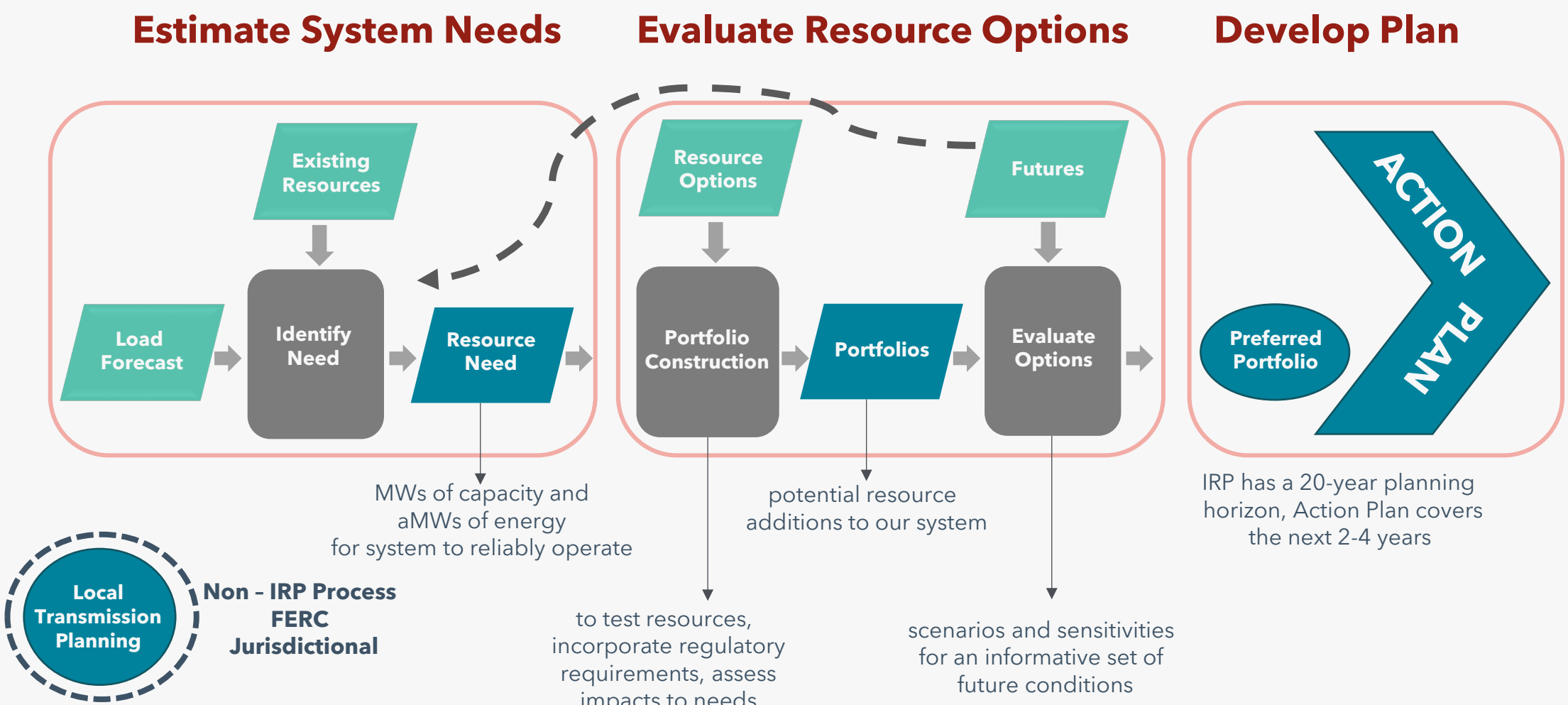
High-Level IRP Analysis Process



Local Transmission Planning Overview & Scope Differences

Local Transmission Plan

The purpose of PGE's Local Transmission Plan is to identify the necessary transmission infrastructure projects within PGE's transmission footprint to reliably serve PGE's transmission customers.

FERC jurisdictional process, with OASIS publication every 12 months.

Relies on power flow analyses under N-1-1 contingencies, as well as voltage stability, transient stability, and short circuit studies.

IRP Transmission Expansion

IRP assumes all reliability driven transmission upgrades within PGE's transmission footprint are energized and in service according to the Local Transmission Plan.

The purpose of PGE's IRP Transmission Expansion analysis is to assess whether PGE's generation needs require additional transmission actions on PGE-owned or third-party transmission systems to deliver to load.

Relies on economic decisions driven by resource need.

OPUC jurisdiction

AGENDA

1. PGE Service Territory & Topology
2. Load and Resources Forecast
3. Economic Studies & Stakeholder Submissions
4. Regional Transmission Projects
5. Methodology Review
    1. Steady-State Studies
    2. Short Circuit Studies
    3. Reactive Margin (Voltage Stability) Studies
    4. Transient Stability Studies
6. Corrective Action Plans (Planned Projects)
7. Large Generator Interconnection Application Projects, Projects to Access Regional Generation Resources, and Projects to Increase Regional Transmission Capacity

PGE Service Territory

Covers more than 4,000 square miles and provides service to over 950,000.
- Confined within Multnomah, Washington, Clackamas, Yamhill, Marion, and Polk counties in northwest Oregon.

Directly connected to Bonneville Power Administration (BPA) and PacifiCorp (PACW)

In total, PGE owns 1,624 circuit miles of Transmission at voltages ranging from 57kV to 500kV.

Voltage Level	Pole Miles	Circuit Miles
500kV	268	268
230kV	290	335
115kV	520	559
57kV	429	463

PGE Service Territory

The following PGE-owned 500 kV and 230 kV lines are essential elements of regional transmission paths

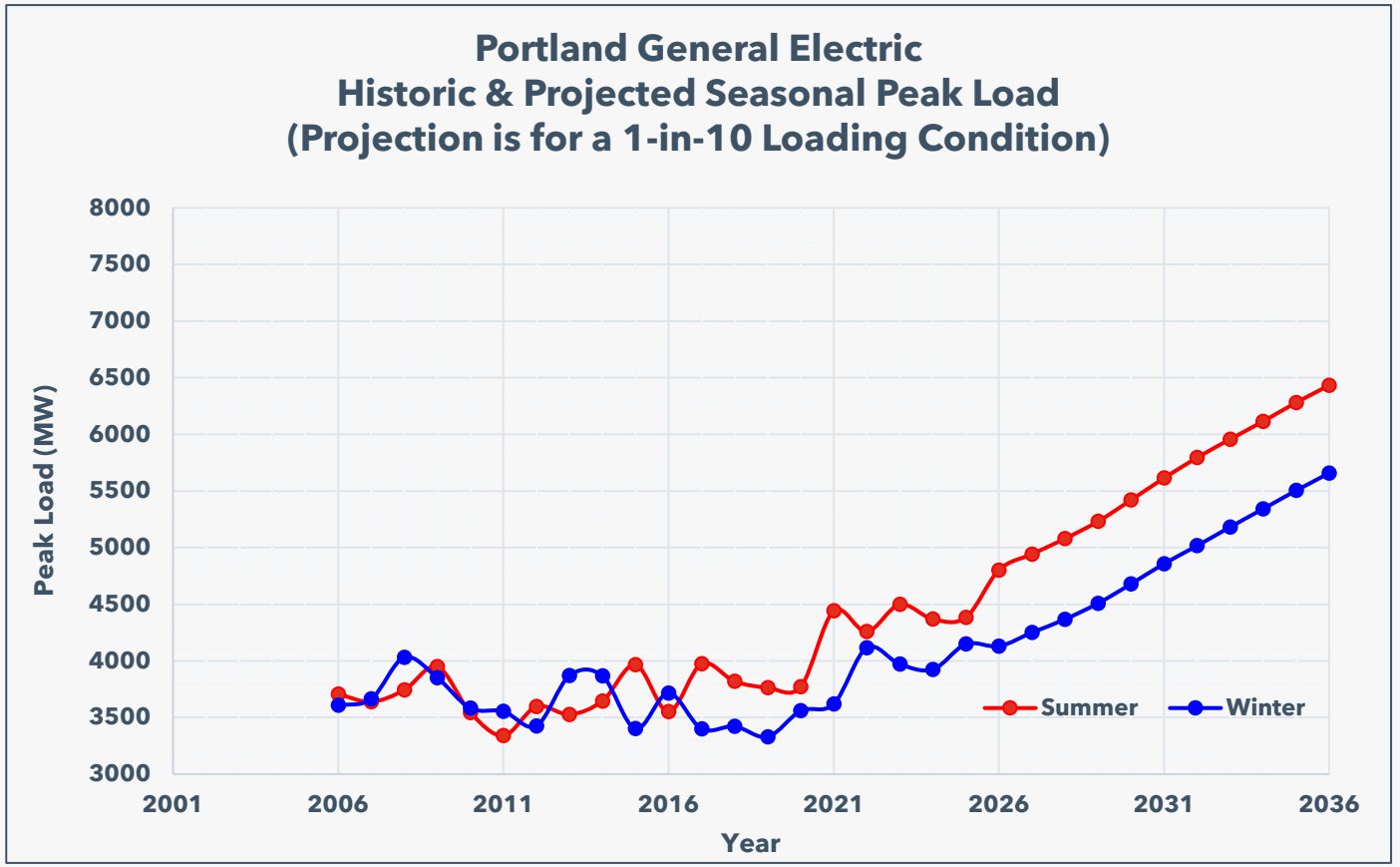
- Grizzly BPA-Malin BPA #2 500kV and Grizzly BPA-Round Butte 500kV → Northwest AC Intertie (NWACI)
- PGE has approximately 15% ownership in the Colstrip-Townsend #1 and #2 500kV lines → Montana to Northwest
- Bethel-Round Butte 230kV → West of Cascades South (WOCS)
- The Harborton-Trojan #1 230kV and Evergreen-St Marys-Trojan 230kV → South of Allston (SOA)
- Pearl BPA-Sherwood 230kV and McLoughlin-Pearl BPA-Sherwood 230kV (co-ownership) → North of Pearl (NOPE)

Load Forecast

PGE's transmission system is evaluated for a 1-in-10 peak load condition during the summer and winter seasons for Near Term (years 1 through 5) and Longer Term (years 6 through 10) studies. Numbers below are for the June 2025 version of the forecast.

Summer (°F)	
1-in-3	82
1-in-5	85
1-in-10	87
1-in-20	89

Winter (°F)	
1-in-3	27
1-in-5	22
1-in-10	22
1-in-20	21



Forecasted Resources

PGE IRP Preferred Portfolio from 2023 IRP Update. "Proxy" generation resources are included in PGE transmission base case models, presented in the table below.

	Capacity by year (MW)										
	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Existing Batteries*	475										
Gorge Wind			0	0	796	0	0	0	0	356	22
MT Wind		0	0	0	427	0	0	879	431	81	0
SEWA Wind		0	0	0	139	0	0	788	0	0	0
WY Wind		0	0	0	0	0	0	0	0	0	400
Christmas Valley Solar		0	0	0	889	0	0	0	0	0	0
Christmas Valley Hybrid Storage (4hr Battery)		0	0	0	600	0	0	0	0	0	0
McMinnville Solar		0	0	0	200	0	0	0	0	0	0
McMinnville Hybrid Storage (4hr Battery)		0	0	0	150	0	0	0	0	0	0
4hr Battery On-System		0	0	0	500	500	500	0	0	0	0

*Includes Constable (75MW), Seaside (200MW), and Sundial (200MW) Battery Energy Storage System (BESS) facilities

Economic Studies & Stakeholder Submissions

PGE did not receive any economic congestion study requests or stakeholder data submissions during the 2024-2025 planning cycle.

Inclusion of Regional Transmission Projects

Specifically for the 2025 studies, PGE added the following BPA-announced projects to the transmission base case models:	Keeler 500/230kV Transformer Addition (5- and 10-year cases)
	Big Eddy-Chemawa 230 to 500kV Line Upgrade (10-year cases)

For additional details on these projects, see:

https://www.bpa.gov/energy-and-services/transmission/grid-expansion-and-reinforcement-portfolio

Methodology Summary

- Meet the performance requirements established in the NERC TPL-001-5 Reliability Standard and the WECC TPL-001-WECC-CRT-4.0 Regional Criteria.
- PGE maintains system models that use data provided in WECC base cases in accordance with the MOD-032 reliability standard.
- Electrical facilities modeled in the cases have established ratings, as defined in PGE's "Facility Ratings Methodology" document and in accordance with the FAC-014 reliability standard
- A facility rating is determined based on the most limiting component in each transmission facility, in accordance with the FAC-008 reliability standard.

Methodology Summary

The powerflow cases used in this year's assessment are described below. Topology, generation, and load changes are implemented to modify the cases as needed.

		Study Year	Origin WECC Base Case	PGE Case Name	PGE System Load (MW)
SUMMER	Year One/Two Case	2027	2025 HS4-OP	27 HS PLANNING	4941
	Year Five Case	2030	2030 HS2	30 HS PLANNING	5419
	Year One/Two Sensitivity	2027	2025 HS4-OP	27 HS SENSITIVITY	5027
	Year Five Sensitivity	2030	2030 HS2	30 HS SENSITIVITY	5506
	Longer Term Case	2035	2035 HS4	35 HS PLANNING	6280
WINTER	Year One/Two Case	2027-28	2024-25 HW3-OP	27-28 HW PLANNING	4375
	Year Five Case	2030-31	2029-30 HW2	30-31 HW PLANNING	4867
	Year One/Two Sensitivity	2027-28	2024-25 HW3-OP	27-28 HW SENSITIVITY	4435
	Year Five Sensitivity	2030-31	2029-30 HW2	30-31 HW SENSITIVITY	4880
	Longer Term Case	2035-36	2034-35 HW1	35-36 HW PLANNING	5668
SPRING	Year One/Two Off Peak Case	2027	2026 LSP1	27 LSP PLANNING	2833
	Year Five Off Peak Case	2030	2026 LSP1	30 LSP PLANNING	3158
	Year One/Two Off Peak Sensitivity	2027	2026 LSP1	27 LSP SENSITIVITY	2833
	Year Five Off Peak Sensitivity	2030	2026 LSP1	30 LSP SENSITIVITY	3158

Methodology Summary

Steady-State Studies	Considers all Contingency scenarios identified in Table 1 of the NERC TPL-001-5 reliability standard to determine if the BES meets performance requirements. For Voltage, PGE uses the criteria defined in the WECC TPL-001-WECC-CRT-4.0.
Cascading Analysis	The uncontrolled successive loss of System Elements triggered by a Disturbance that results in the inability of the Elements of the BES to regain a state of operating equilibrium, is defined as a System instability. PGE has a detailed process to test for and prevent this, ensuring system stability.
Uncontrolled Islanding	This refers to an undesirable separation of parts of the system with generation and load, leading to instability. PGE defines and works to prevent such occurrences.
Short Circuit Studies	Performed annually to ensure circuit breakers can interrupt fault currents safely. If a breaker's duty exceeds 97% of its rating, projects are identified to address it.
Voltage Stability Studies	These assess the system's ability to maintain stable voltage under different conditions, following WECC Criterion WR5 by simulating P0 and P1 events at 105% of forecasted peak load and simulating P2-P7 events at 102.5% of forecasted peak load.
Transient Stability Studies	These evaluate the system's dynamic response to disturbances like faults, ensuring generators remain synchronized, and system frequency and voltage stay within acceptable limits after an event. They also simulate the impact of protection systems and automatic controls.

Results: To be published in the final 2024-25 LTP document*

The longer-term analyses being performed include:

- Steady State Analysis
- Short Circuit Analysis
- Reactive Margin Analysis
- Transient Stability Analysis

These will be posted in the final version of the 2024-2025 Local Transmission Plan by the end of the year.

***These slides were drafted on 12/19/2025. Finalized LTP with results will be published on OASIS by 12/31/2025.**

Corrective Action Plans (Planned Projects)

The Near- and Longer-Term projects required to address steady-state overload concerns, aging infrastructure, or overdutied breakers on PGE's system are as follows:

Project Name	Project Completion Date
Grand Ronde Transformer Replacement	May-26
Harborton Reliability Project(Harborton Phase 2 & 3)	Apr-28*
Bethel-Culver 115kV Reconductor	Jun-28
Bethel 115kV Project	Apr-29
Bethel-Market 115kV Reconductor	Jun-29
Bethel VWR2 Replacement	Jan-31
Bethel 230kV Project	Apr-31
Carver-Sellwood 115kV Reconductor	Apr-31
Glencullen Rebuild & Cedar Hills Breakers	Apr-31
Happy Valley Substation	Apr-31
Evergreen-Harborton 230kV and Harborton-St Marys 230kV Reconductor (Harborton Phase 4)	Apr-32
Gresham Rebuild and VWR3 addition	Apr-32

**Harborton Reliability Project is currently scheduled for a 2028 in-service date. Due to ongoing permitting challenges with the project, a delay to the in-service date to 2031 was modeled in this year's transmission models, in order to quantify the impacts of not completing this work by the 2028 need date. The modeled delay identified contingencies that would result in overloads to the transmission system which can only be alleviated via customer load shed actions until the Harborton Reliability Project is completed.*

Corrective Action Plans (Planned Projects): Continued

The Near- and Longer-Term projects required to address steady-state overload concerns, aging infrastructure, or overdutied breakers on PGE's system are as follows:

Project Name	Project Completion Date
Horizon-Keeler #1 230kV Reconductor Project	Apr-26
Monitor Rebuild Project	Apr-26
Pearl BPA-Sherwood 230 kV Project	Jun-26
Shute and Sunset Facility Upgrades Project	Sep-26
St Marys 115kV Breaker Replacement Project	Mar-27
Sunset 115kV Bus Split Project	Apr-27
Tonquin Substation Project	Apr-27
Holgate 115kV Conversation Project	Jun-28
North of Sherwood 230kV Project	Jun-28
Springwater and Cazadero Grid Modernization Project	Jun-28
Sherwood 115kV Project	Mar-29
Horizon-Keeler #1 & #2 230kV 4000A Upgrades	Apr-29
Reedville Substation Rebuild	Jan-30
Main 57kV to 115kV Project	Apr-30
Willamette Valley Resiliency Project (3 parts)	May-31
Warm Springs Power Pathway	Mar-32

Large Generator Interconnection Application Projects, Projects to Access Regional Generation Resources, and Projects to Increase Regional Transmission Capacity

The following projects are driven primarily by the need for the need to connect generation resources to PGE system load, and to generally increase regional transmission capacity toward that aim. The need and justification for such projects is provided by a combination of transmission planning analysis, IRP analysis, and more generalized energy market studies.

Project Name	Project Completion Date
Blue Lake-Glendoveer 115kV reconductor	Mar-27
Tualatin (Nottingham) Battery Project	Dec-27**
Madras Solar Project	Mar-28*
Jefferson Solar Project	Mar-28*
Bethel-Round Butte 230kV Fixed Series Capacitor	Nov-28*
Harborton-Trojan #3 230kV (Harborton Phase 5)	Apr-35

*Note that both Jefferson and Madras Solar projects, as well as the associated Bethel-Round Butte Fixed Series Capacitor Project, are on holding pending further action from the interconnection customers. Completion dates shown for these projects are highly speculative.

**Similarly, the Nottingham BESS project timing is dependent on ongoing interconnection customer and IRP/RFP discussions

PGE Grid Enhancing Technology Strategy in the 2026 IRP

PGE GETs Strategy – 2026 IRP

Language from Oregon HB3336:

An electric company shall file and include as part of the electric company's clean energy plan required under ORS 469A.415, and the electric company's integrated resource plan filed with the commission, a separate section that provides a strategic plan for using grid enhancing technologies where doing so is cost-effective. The electric company shall update the strategic plan concurrently with the development of, or update to, each integrated resource plan and make the strategic plan publicly available. At a minimum, the strategic plan must:

(a) Include a timeline for deploying grid enhancing technologies where doing so is cost effective

(b) Report on the electric company's continual progress towards implementing the strategic plan; and

(c) Be designed to:

- (a) Increase transmission capacity;
- (b) Increase transmission reliability;
- (c) Reduce transmission system congestion;
- (d) Reduce curtailment of renewable and non-emitting energy resources; and
- (e) Increase capacity to connect new renewable and non-emitting energy resources.

PGE GETs Strategy – 2026 IRP

PGE evaluates Grid Enhancing Technologies through a range of planning processes today

- PGE Local Transmission Plan (see PGE 2024-25 LTP document posted on OASIS)
  - Process is described in PGE Open Access Transmission Tariff, Attachment K (on OASIS)
- FERC Order 2023 Large Generator Cluster Study process
  - Process is described in PGE Open Access Transmission Tariff, Attachment O (on OASIS)
- FERC Order 881, Order 1000, and Order 1920 Regional Transmission Planning Process
  - PGE anticipates updates to Attachment K to comply with Order 1920, in coordination with other regional utilities
- PGE Large Load Customer Studies
- Individual transmission project studies (documented in project White Papers)

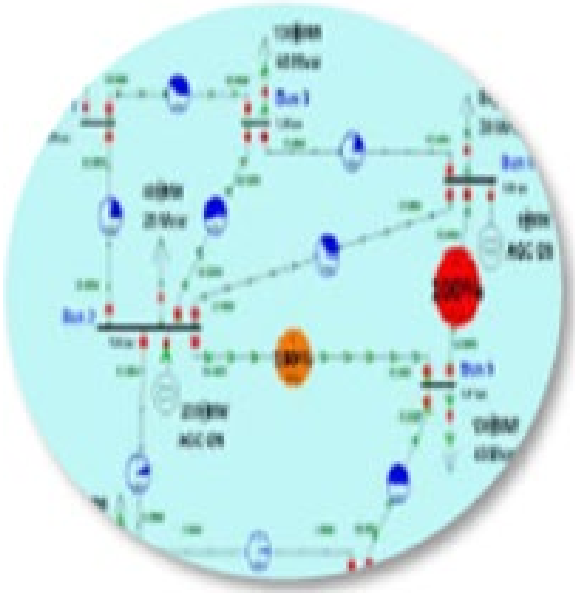
Getting the Most Out of What We Have

Grid Enhancing Technologies (GETs)

Advanced Conductors

Dynamic Line Ratings

Power Flow Controllers



Topology Optimization

Guided Feedback – Local Transmission Planning

Process: Has PGE clarified how local transmission planning differs from IRP/CEP transmission expansion analysis?

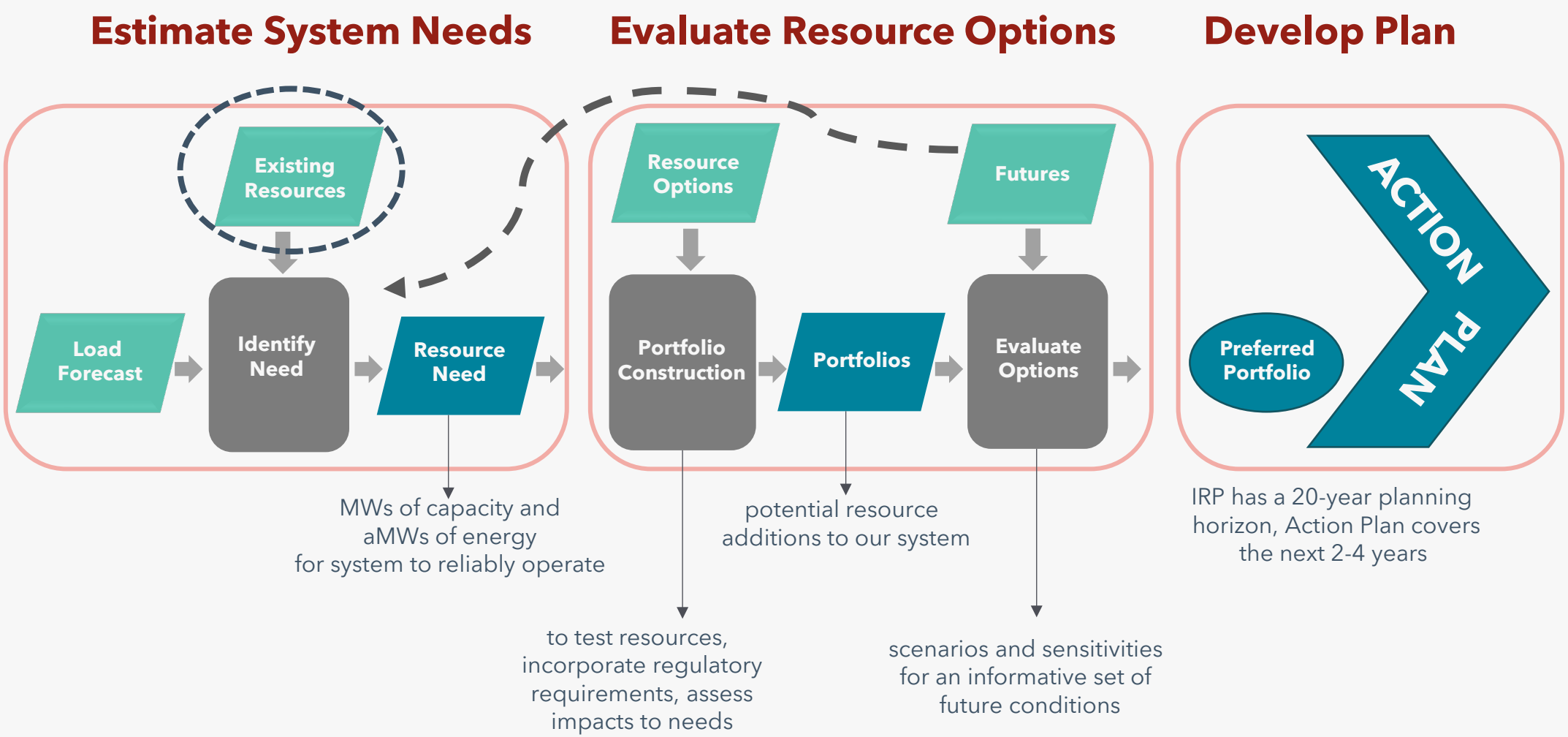
Content: Are there additional Grid Enhancing Technologies that you would like to see discussed in PGE's GETs IRP strategy section?

Resource Contract Extension Update

Lauren Slawsky
Principal Integrated Resource Planning Analyst
Integrated Resource Planning

PGE An Oregon kind of energy.℠

High-Level IRP Analysis Process



Resources in IRP Needs Assessment

Needs assessment starts with load (demand) compared to a 'base portfolio' representing known resources (i.e., existing, known new entrants, contracts & expirations, etc.)

- December 2025 Roundtable

Oregon IRP rules* for needs assessment

OAR 860-090-0060(6)(a)

"The utility must calculate resource needs based on the utility's load forecast, which must be the most recent available at the time that the needs assessment calculation is performed, and

no incremental actions beyond the commitments that the utility has entered into at the time of conducting the analysis."

2026 IRP

Corporate Load Forecast from Fall 2025

- October 2025 Roundtable

Known resources and contract extensions as of this Winter

- October 2025 Roundtable
- Following slides

***Note**: Language shown represents proposed (not yet final) IRP rules that PGE is planning toward. See OPUC Docket AR 669.

Existing Contracts: Summary

Expiring Contract	Type	Max Capacity or Nameplate	Expiration Date	Update Since 2024
BPA Capacity Contract	Low-Emitting	200 MW	12/31/25	-
Douglas AMA	Hydro	2024: 258 aMW 2025: 201 aMW	12/31/25	-
Grant 20p	Hydro	434 MW	12/31/26	-
Douglas - Wells Legacy	Hydro	2025: ~71 aMW 2026: ~28 aMW	9/30/28	Updated PGE Share from 8.49% to 3.28%
Colstrip	Coal	296 MW	12/31/29	-
Douglas 10p	Hydro	79 MW	12/31/30	-
Calpine's Hermiston HRCO	Gas	250 MW	12/31/34	Extended to 12/31/34
Small VERs & Qualifying Facilities (QFs)	Wind & Solar	~57 aMW	12/31/45	Assume 75% Renewal

Notes:
- Each of these contracts is unique and this table does not capture all contractual complexities.
- Many of the above expiring contracts were also discussed at the October 2025 Roundtable.

Additional Contracts to be Studied as Resource Options

Prospective contracts, not yet executed at time of analysis, **will not be included** in resource need assessments.

Note certain contracts **will be evaluated** as resource options to meet estimated resource needs in portfolio analysis.

Anticipated contracts for evaluation as resource options in portfolio analysis include:

- RFP proxy resources not yet executed, based on final short list(s)
- Natural gas contracts for reliability only / HB 2021 counterfactual analysis
- Hydro contract opportunities

Guided Feedback – Resource Contract Extension Update

Process: Do you have any comments or questions regarding contract commitment assumptions for needs assessment and portfolio analysis in the IRP?

Flexibility Study Overview

Ana Mileva, Sylvan Energy

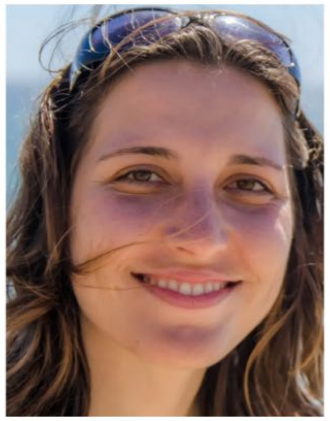
PGE An Oregon kind of energy.℠

Outline

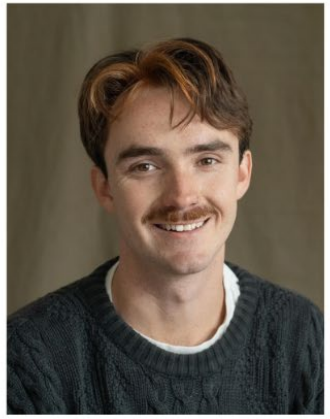
- Purpose and Background
- Use of GridPath
- Base Assumptions

Sylvan Energy Analytics

provides consulting services and innovative grid analytics software to guide clean energy planning and policy


Ana Mileva

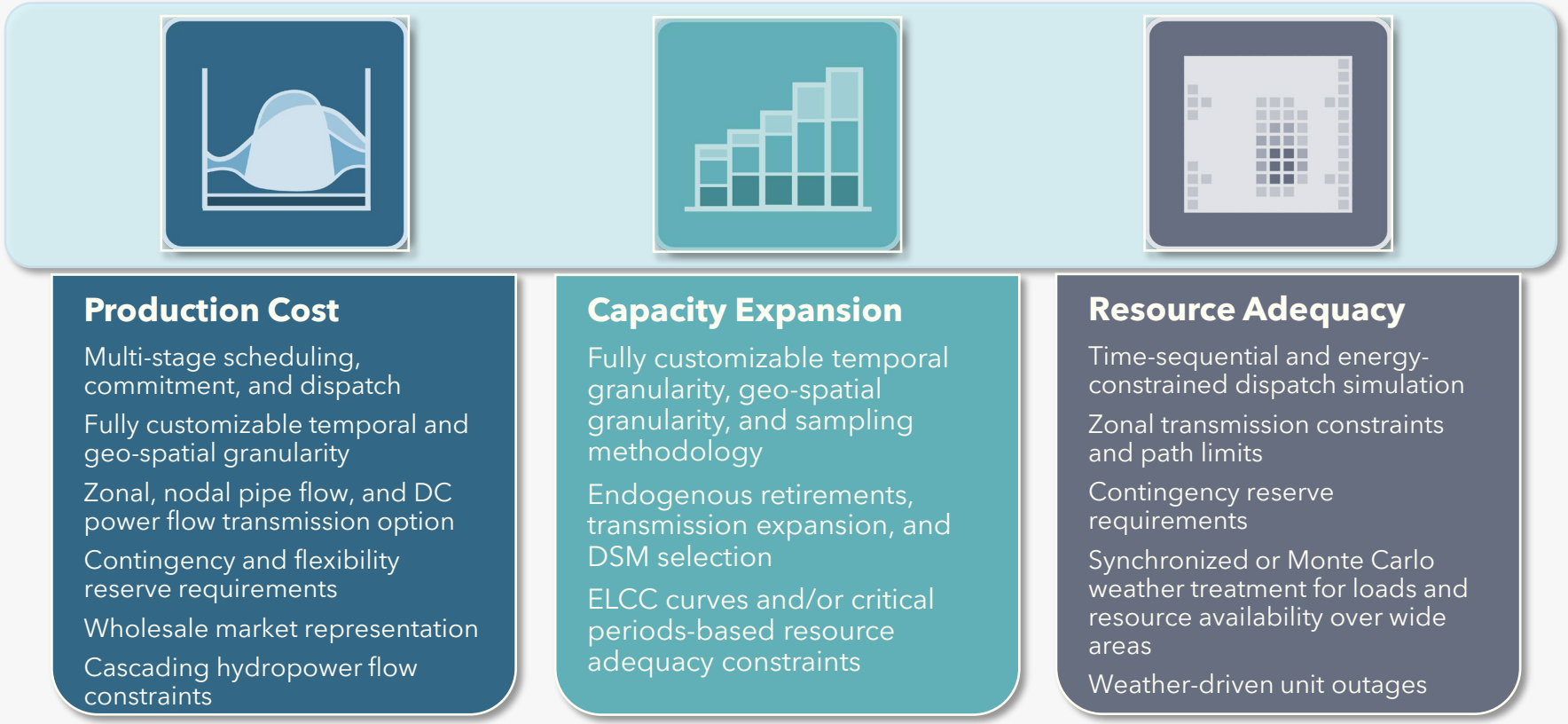

Elaine Hart


Jaxon Stuhr

- Extensive experience in integrated resource planning, working across the utility industry, with specific expertise in the Pacific Northwest
- Sylvan develops and maintains GridPath, an open-source, versatile grid-analytics platform for capacity expansion, production cost, and resource adequacy analysis

- **PGE has engaged Sylvan to refresh the 2023 IRP flexibility analysis**
- **Experience with PGE IRPs**
  - 2016 IRP: led capacity-adequacy and reliability study (E3)
  - 2019 IRP: led flexibility adequacy analysis (Blue Marble Analytics)
  - 2023 IRP: led flexibility adequacy analysis (Blue Marble Analytics)
- **Expertise across a range of topics:**
  - Software development
  - Data analytics
  - Resource planning and portfolio optimization
  - Asset optimization and valuation
  - Renewables integration
  - Storage, demand response, hybrids
  - Clean energy policy

GridPath is an open-source, versatile modeling ecosystem for power system planning



- Open-source codebase available at https://github.com/blue-marble/gridpath
- has been benchmarked against PLEXOS and RESOLVE

IRP Flexibility Analysis Scope Overview

Three main component studies:

Flexibility Adequacy	Flexibility Value	Variable Energy Resource Integration Costs
seeks to model flexibility adequacy and evaluate how different resources contribute to it.	evaluates the $ value of flexibility provided by different resources such as energy storage, flexible loads, gas generators.	estimates the $ costs of integrating additional variable energy resources into the PGE system.

- '**Flexibility**' describes the ability of an electricity system to respond to rapid supply or demand changes
  - Grows in importance as the share of renewables grow
  - Dispatchable capacity (either from S/CCCT or battery storage)
- A set of studies that aim to assess flexibility needs, value, and costs
- The three studies will be conducted using GridPath's multi-stage optimal commitment and dispatch functionality

GridPath: Production-Cost Simulation

Multi-stage unit-commitment and dispatch with flexible temporal span and resolution

Day-Ahead (DA) Commitment	Hour-Ahead (HA) Commitment	Real-Time (RT) Dispatch
• Generator commitment schedules based on DA load and renewable forecasts (hourly)	• Residual generator commitment schedules based on HA load and renewable forecasts (15-minute)	• Actual load and renewable output (15-minute)

Generators modeled with a high level of operational fidelity:

Heat rate curves	Minimum up and down times	Ramp rates

Will also incorporate:

- Fuel constraints
- Market availability limits
- Reserve requirements

Base Case Assumptions

Data Input	Flexibility Adequacy	Flexibility Values and Integration Costs
Test Years	2030, 2035	<
Gas Prices	Reference	<
Carbon Prices	Reference	<
Electricity Prices	Reference	<
Load Forecast	PGE Sept. 2025 for test years	<
VER generation	Updates in Progress	<
Existing Contracts	Up to date	<
Market Availability	Purchase & Sales limits aligned with Sequoia	<
Reserves	Regulation, contingency, and load-following reserves	<
Capacity Availability	DA, high load hour block capacity that is more expensive than existing system generation & markets, and provides no flexibility	RFP proxy resources and expensive, unconstrained purchases

Flexibility Study Status

PGE has engaged Sylvan to refresh the 2023 IRP flexibility analysis for the 2026 IRP

Model is running with draft inputs

Modeling will be for the two test years (2030, 2035) to estimate the flexibility value ($) and integration costs ($) of various resources for use in IRP analysis

Draft results expected at the February 2026 Roundtable

Guided Feedback – Flexibility Study Overview

Process: Do you have any comments or questions regarding the purpose and approach of the flexibility study?

Questions

Clean Energy Plan – Overview

Lauren Slawsky
Principal Integrated Resource Planning Analyst
Integrated Resource Planning

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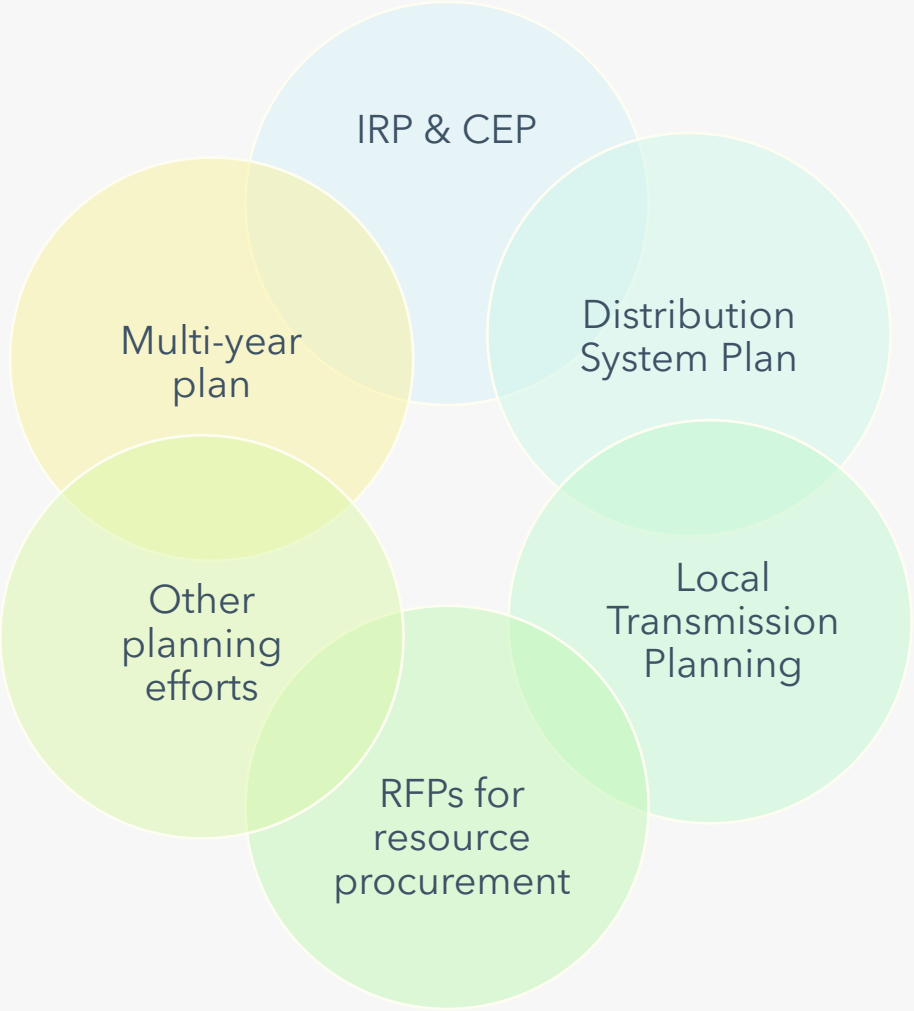
Outline

- CEP Overview
- Progress and Planning
- Considerations for this IRP

Overview – Clean Energy Plan (CEP)

- Required **plan** for meeting the clean energy targets in ORS 469A.410 (established in HB 2021), which are GHG emissions targets for retail load, below a baseline level:
    - 80% by 2030; 90% by 2035; 100% by 2040+
- Applies a **community lens** to decarbonization planning as part of setting targets, community-based generation, and analysis around resiliency
- Robust **engagement** as this plan is developed, including these IRP technical roundtables, coordination with the CBIAG, DSP community engagement, etc.
- PGE's CEP is filed concurrently with the IRP for **one connected plan to progress toward a more equitable and carbon-free grid**



CBIAG = community benefits & impacts advisory group
DSP = distribution system plan
RFP = request for proposals

CEP development leans on learnings from existing analyses, robust processes, and stakeholder interests

PLANNING ANALYTICS

- Forward view of needs and solutions
- Proxy new resource options for least-cost least-risk approach to affordable, reliable system
- OPUC acknowledgement for consistency with Oregon rules

STAKEHOLDER FEEDBACK

- Builds on experience with DSP partnership and community workshops
- Technical IRP roundtables
- Learnings year over year

Clean Energy Plan

- ☑ Consistent with IRP (does not re-run system planning process)
- ☑ Report-out focused on GHG emissions performance
- ☑ Translates planning analytics to HB 2021 "continual progress" expectations
- ☑ Summarizes resource planning in a way that aligns with public interests
- ☑ Seeking Commission acknowledgement in tandem with IRP

COMMUNITY INTERESTS

- Human-centered approach and application of equity lens to planning
- Community benefits, opportunities, and resiliency focus

RESULTS FOCUS

- Quantifiable metrics, where relevant and able
- Accountability for change
- Focus on impact and benefits

HB 2021 Target Year(s): Demonstrating Compliance

GHG emissions are from **fossil fuels combusted** to generate electricity. Reducing emissions requires steadily adding cleaner resources (renewables, battery storage, energy efficiency and demand response) that enable reliable and affordable reductions in thermals (fossil fuels, coal, gas).

Targets for 2030, 2035, 2040 are for **retail load**, i.e., only emissions from power that is used to serve PGE's residential, commercial, industrial customers and does not include emissions from power sold by PGE to serve non-PGE customers.

Based on current regulations, ultimate compliance for target years will be determined by **emissions data reports submitted to ODEQ**. Reporting, in alignment with requirements in OAR Chapter 340 Division 215, occurs in the year after to capture actual operations for a given year.

Actual generation from different resources, emitting or non-emitting, is counted if it served retail load. Renewable Energy Certificates (RECs) that can demonstrate compliance with the state's Renewable Portfolio Standards (RPS) are not used to demonstrate compliance with HB 2021.

ODEQ = Oregon Department of Environmental Quality

More on GHG emissions data reporting here: https://www.oregon.gov/deq/ghgp/pages/ghg.aspx

Evolving Recent Policy & Commercial Changes/Uncertainties

Federal Regulations and Policies
Essential federal tax credits have been targeted for elimination by US Congress – could increase renewable costs by at least 30-50% or more

Resource Availability
New generation resources are limited by permitting and interconnection delays, limited transmission access, and the availability of major equipment that is increasingly subject to tariffs

Resource Costs
The capital costs of new generation resources have increased as have financing costs, due to wildfire risks and tariff policies

Significant Industrial Growth
Increasing demand increases resource need while regulatory process is underway to ensure appropriate cost allocation for large customers

PGE expects that the affordability of our clean energy transition will be meaningfully impacted

PGE recognizes that resource availability limitations and challenges associated with rapid, large resource additions can also delay PGE's timeline

Guided Feedback – Clean Energy Plan – Overview

Process: Do you have any comments or questions regarding PGE's process for developing the Clean Energy Plan (CEP) and how it connects to the IRP process?

Content: Is it clear how demonstrating compliance with HB 2021 targets will work in relation to clean energy and emissions reductions?

Questions

Community Benefit Indicators (CBI's)

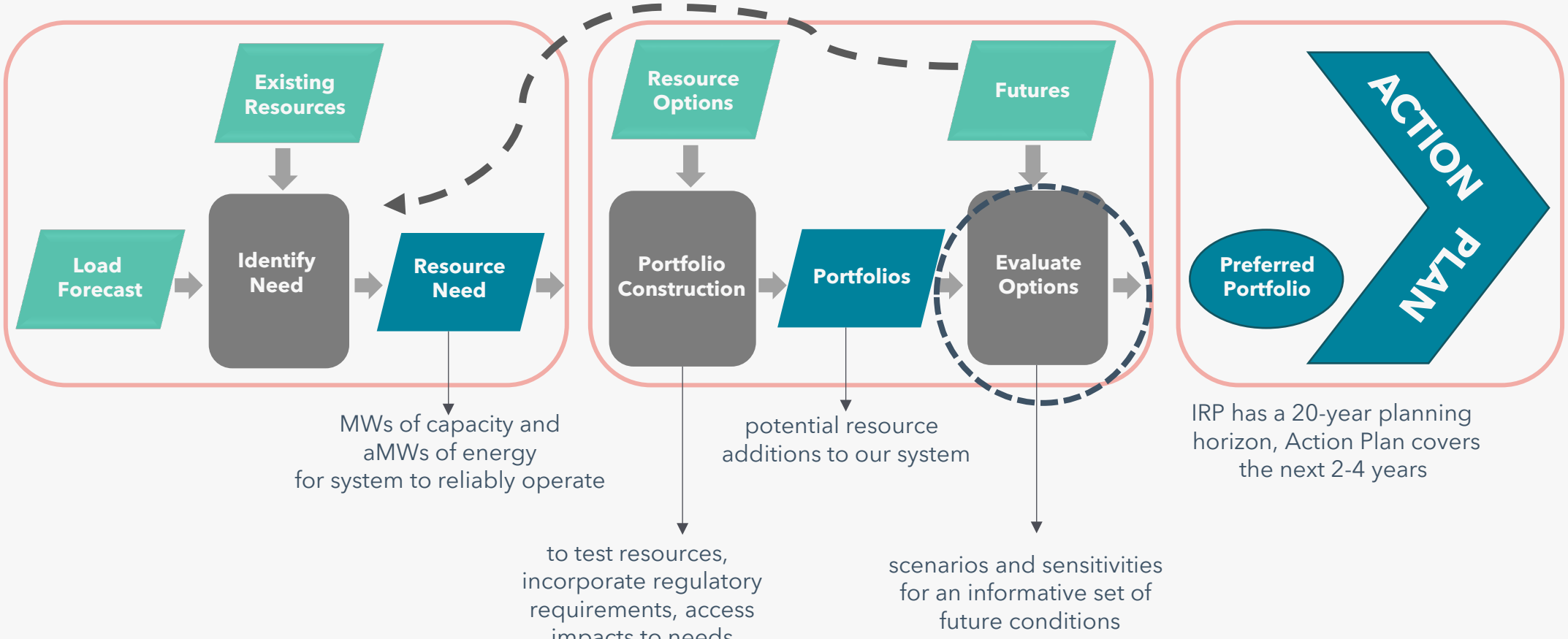
Bachir Salpagarov
Principal Strategy & Planning Analyst
Integrated Resource Planning

PGE An Oregon kind of energy.℠

Outline

- CBI overview and established framework
- Key learnings and feedback received
- CBI's in 2026 IRP/CEP

High-Level IRP Analysis Process



Community Benefit Indicators (CBIs)

PGE received direction (from UM 2225) on how to incorporate CBIs:

Resource (rCBI)

- Informs and tracks progress on specific outcomes achieved through CBRE actions
- Should be reflected in the CBRE potential study and IRP portfolio scoring

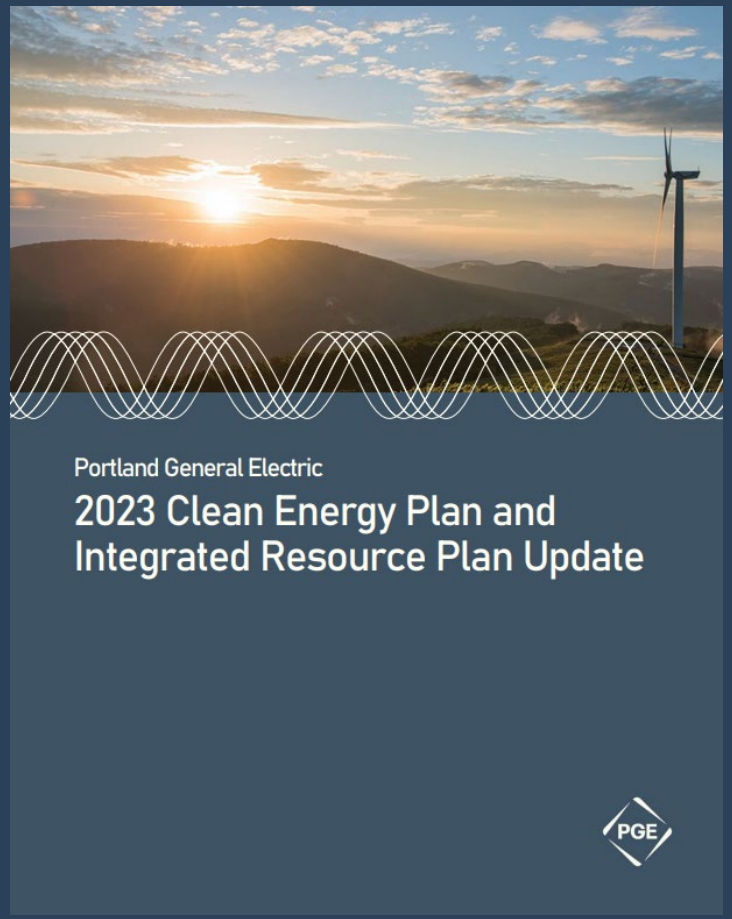
Portfolio (pCBI)

- Addresses the impacts of the utility's portfolio on communities
- May or may not be tied to CBREs, and should be reflected in IRP portfolio scoring

Informational (iCBI)

- Provides transparency into topics of importance to communities
- May or may not directly inform portfolio scoring in IRP

Summary of CBI actions for 2023 IRP Update



PGE partnered with Cadeo (now Resource Innovations) for research on CBI's

Expanded CBI list to 30 and refined the valuation methods

Continued stakeholder collaboration

Staff Direction on CBIs (UM 2225)

A. Staff directed PGE to develop **Community Benefit Indicators (CBIs)** for the first Clean Energy Plan in coordination with communities served by the utility and with input from stakeholders and Staff.

B. Staff specified that, at a minimum, CBIs must be **quantifiable and measurable** and collectively address **five topic areas:**

- Resilience
- Health & Community Well-Being
- Environmental Impacts
- Energy Equity
- Economic Impacts

C. Staff further required that CBIs span **three functional categories:**

- CBRE-focused CBIs to track and evaluate Community-Based Renewable Energy actions (rCBI)
- Portfolio-level CBIs to assess how the overall resource portfolio impacts communities (pCBI
- Informational CBIs to provide context (iCBI)

CBI Catalog – Approach Steps

Identify CBIs	Develop CBI List	Catalog & Characterize	CBI Applicability	Trackable Metric vs. Monetizable CBIs	Available Data & Valuation Method	Translate CBIs to IRP
Consolidate a list across sources	Pare down to a unique set for this study and align with PGE on gaps/edits of CBI list	Assign attributes like CBI type or OPUC category	Identify linkage with different resource bundles	Determine which CBIs can be quantified as a trackable metric vs. those that can be quantified and monetized	Often at a CBI/resource level, rather than overall/cross-cutting CBI across resource types	Translate the estimates to IRP inputs ($/MW) for given resource bundles

List of CBI's developed for 2023 IRP/CEP Update

(By OPUC Category)

CHARACTERIZING CBIS BY CATEGORY

Economic Impacts | Health + Community Wellbeing | Energy Equity | Resilience/Reliability | Environmental

1	Economic development impact	7	Ancillary services	13	Increased availability of electricity storage in Tribal and non-Tribal communities	19	Increased satisfaction and pride	25	Improved grid resiliency
2	Increased access to jobs	8	Reduction in GHG Emissions	14	Increased number of clean energy generation that powers Tribal communities	20	Improved comfort in home	26	Increased resilience/reliability in targeted communities
3	Increased property or asset values	9	Improved access to reliable clean energy	15	Improve efficiency and housing stock in utility service territory, including LI housing	21	Improved public health outcomes	27	Reduction in recovery time and increase in survivability from outages
4	Economic well-being	10	Improved participation in clean energy programs by EJ communities	16	Increased energy affordability/reduction in energy burden for EJ communities	22	Improved community health outcomes in targeted communities	28	Reduction in frequency and duration of black/brownouts in target communities
5	Increased productivity	11	Increased awareness of utility programs for EJ communities	17	Reduced arrearages/late payments	23	Reduced local emissions (pollution burden, pollution exposure)	29	Reduced risk to targeted communities from outages
6	Energy security	12	Meaningful bilateral engagement between utilities and tribes on siting	18	Reduced residential disconnections and collections	24	Improved household health and safety outcomes in targeted communities	30	Increased neighborhood safety from natural disasters

List of CBI's developed for 2023 IRP/CEP Update

(By CBI Type)

CBI CATEGORY

Portfolio CBIs Resource CBIs Informational CBIs

1	Economic development impact	7	Ancillary services	13	Increased availability of electricity storage in Tribal and non-Tribal communities	19	Increased satisfaction and pride	25	Improved grid resiliency
2	Increased access to jobs	8	Reduction in GHG Emissions	14	Increased number of clean energy generation that powers Tribal communities	20	Improved comfort in home	26	Increased resilience/reliability in targeted communities
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List of Applicable IRP Resources

CBRE

- CBRE Solar (pCBI & rCBI)
- CBRE Solar Mircrogrid (pCBI)
- CBRE Small Hydro (pCBI)

Portfolio Measures

- Energy Efficiency (pCBI & rCBI)
- Demand Response (pCBI & rCBI)

Portfolio Power

- Battery (2-24hr) (pCBI)
- Pumped Hydro Storage (pCBI)
- In-State Wind (pCBI)
- Out-of-State Wind (pCBI)
- In-State Solar (pCBI)
- Out-of-State Solar (pCBI)
- Solar-Storage Hybrid (pCBI)
- Combustion Turbine (pCBI)

- Simplified list from PGE IRP resource types
- Includes CBREs as well as portfolio resources
- For CBRE and Programs, CBI applicability can occur within subcategories
  - **EE:** Wx/HVAC bundles
  - **DR:** TOU, BTM storage, dispatchable DR (DLC, Interruptible)
  - **CBREs:** include in-front and behind-the-meter, may include EVSE in practice

Application of CBIs in 2023 IRP/CEP Update

- **Resource (rCBI)** applied during portfolio optimization
  - In 2023 IRP, 10% cost reduction simulated for all portfolio scenarios
  - In 2023 IRP Update, rCBI cost reductions were applied to DR, EE, and CBRE's in rCBI-scenario only
  - Allowed CBREs to enter portfolio optimization allowing CBREs to compete with utility-scale resources
  - **Result:** CBREs could be selected even when higher cost

- **Portfolio (pCBI)** applied during portfolio scoring
  - After portfolio was constructed, pCBI scoring was calculated
  - All pCBI's were included in the 2023 IRP Update Preferred Portfolio
  - Score was used in comparative ranking; evaluating trade-offs between cost, risk, and community benefits
  - **Result:** Portfolios with greater CBRE penetration scored higher in pCBI even if not least-cost

- **Total CBREs evaluated included 155 MW by 2030 of CBRE potential**
  - Treated as supply-side resource option
    - Community-Scale Solar = 50 MW
    - Community Microgrid = 100 MW
    - In-Conduit Hydro = 5 MW

2026 IRP Progress

Similar approach as 2023 IRP/CEP, but explicitly review CBREs based on CBRE RFO submissions

Dimension	2023 IRP/CEP Update	2026 IRP
Potential	Modeled, top-down	Market-offered
Costs	Assumed costs based on research/public plans	Bid-based
Technology Mix	Fixed proxies based on 2030 goals	Project applications
CBI Application	rCBI cost-reductions	rCBI cost-reductions

Key Learnings and Feedback Received

During CBIAG engagement, stakeholders prioritized affordability

Data gaps and uneven coverage challenges

Key Learnings and Feedback Received

PGE CBI study found co-deployment opportunities for DR, EE and DERs

By co-deploying EE, DR and VPP resources, PGE can unlock a broader suite of community benefits than pursuing these benefits in isolation. Even when certain EE measures are not cost effective on a stand-alone basis bundling them inside a VPP resource can enhance affordability, resilience, health and equity outcomes in targeted EJ and high energy-burden communities.

EE → DR → VPP : Example CBI Impacts

STEP 1 – Energy Efficiency

Weatherization, high-efficiency heat pump, and LED/appliance upgrades reduce kWh and bills and improve comfort/health.
CBIs: Affordability, Health & Community Well-Being, Environmental, Energy Equity .

STEP 2 – Add Demand Response

Smart thermostat + DR events shift heating at peaks and provide bill credits.
CBIs: Resilience & Reliability, Economic Impacts (capacity/energy), added Affordability & Equity.

STEP 3 – Orchestrate with a VPP

Aggregate ~1,000 EE + DR homes as a 5–10 MW virtual resource. CBIs: stronger Resilience & Reliability, Economic Impacts (deferred peaker/T&D), Energy Equity, Environmental & Health.

EE only

- Lower kWh and bills = some Affordability, Health, Environmental CBIs.
- Peak load largely unchanged = limited Resilience/capacity benefits.
- No flexible value or targeted reliability benefits for EJ communities.

EE + DR + VPP

- EE: lower kWh/bills; better comfort/health = Affordability, Health, Environmental CBIs.
- DR: flexible load = incentives; lower peaks Resilience, Economic, Equity CBIs.
- VPP: aggregated flexible resource defers capacity & T&D, targets EJ areas, reduces peaker use = stronger Economic, Resilience, Equity, Environmental & Health CBIs.

Next Steps

Continue stakeholder and community engagement – details will be shared in the upcoming roundtables.

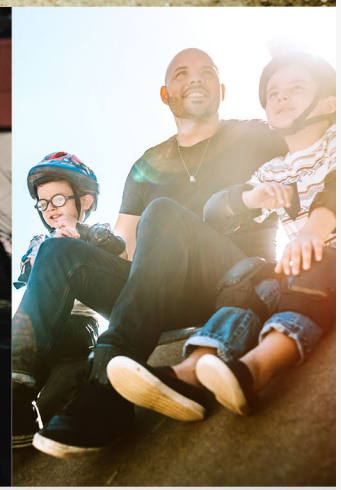
Identify learnings from consideration of community benefits In resource acquisition via CBRE RFO and 2025 RFP

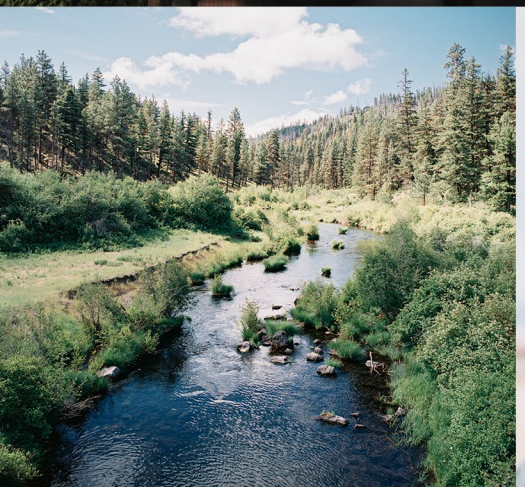
Review opportunities to apply community benefits across resource types

Guided Feedback – Community Benefit Indicators (CBIs)

Process: Feedback from CBIs will come from engagement

Questions





PGE's Community Engagement Approach for the 2026 Clean Energy Plan & Integrated Resource Plan & Beyond

Jenn Latu

Manager Community Outreach
Community Engagement

Our Community Engagement Outcomes and Approach for Integrated Resource Plan (IRP) & Clean Energy Plan (CEP)

Outcomes

- Build shared understanding of how long-term resource planning affects customers and communities.
- Create accessible entry points for participation and learning.
- Learn from community voices to help inform assumptions, priorities and trade-offs in resource planning.

Our approach

- Provide a space for transparent and inclusive conversations where customers/interested parties can participate and shape ongoing engagement efforts.
- Multiple touchpoints across audiences via established venues.
- Integrate resource planning and related topics into cohesive, accessible learning that strengthens ongoing engagement, awareness, and energy knowledge for customers/interested parties.

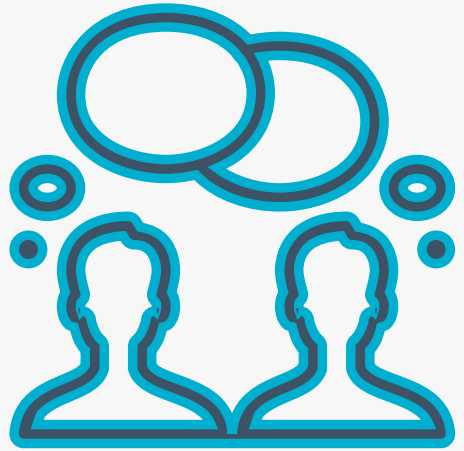
Learning Opportunities for Community Benefits & Impacts Advisory Group (CBIAG) Members

Foundational sessions

- Grid 101 (Nov 2025): Introduction to grid concepts, delivered by a CBIAG member.
- IRP/CEP overviews (Jan & Feb 2026): Sessions to build knowledge about:
  - Planning
  - Modeling and forecasting
  - Community-benefit indicators (CBIs)
  - The All-Source RFP
  - Why the CEP and IRP matter

How the CBIAG will contribute

- Provide experience, community insights and reflections.
- Identify community impacts and opportunities.
- Inform how PGE communicates technical content to broader audiences.



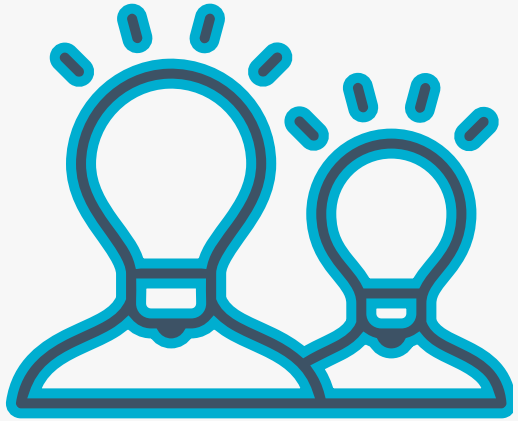
Engagement Opportunities for Customers & Communities

- **Community-based event**
  - East County Resiliency Fair (Feb 2026):
    - Space for community conversations on community benefits as it relates to energy.

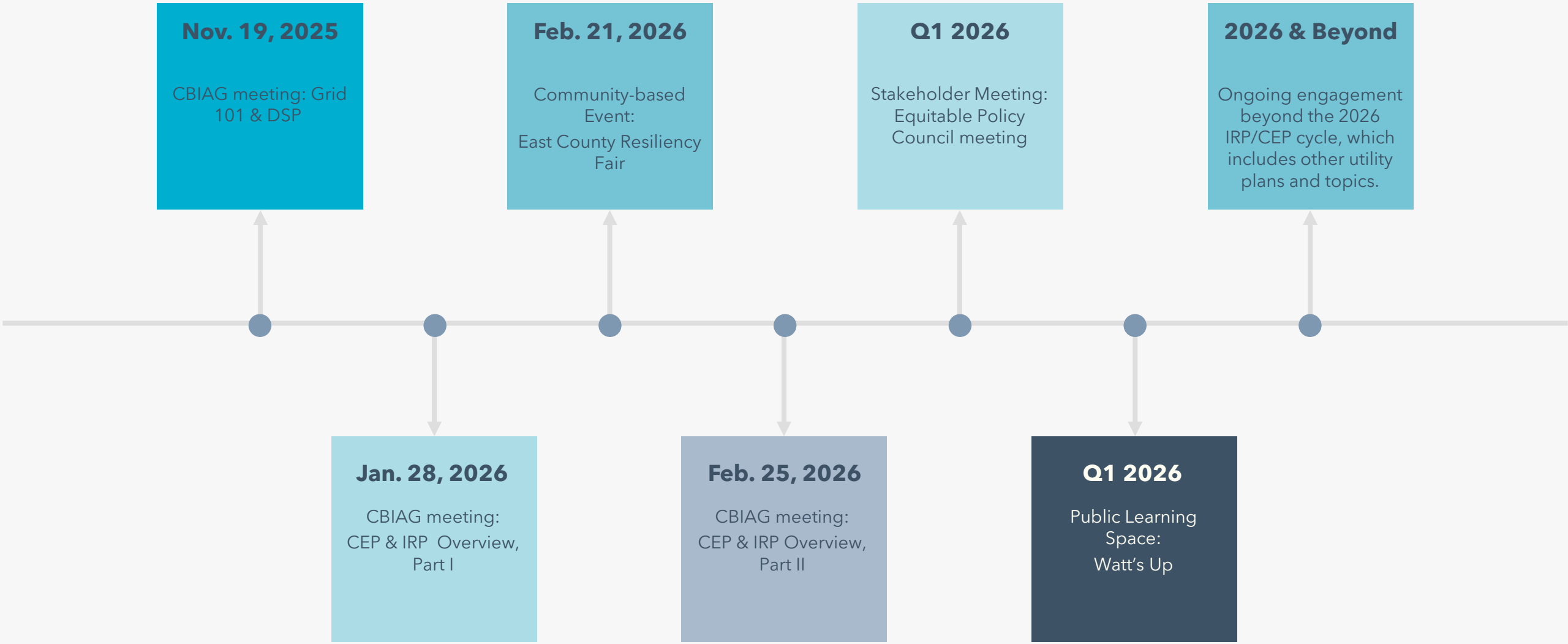
- **Public learning space**
  - Watt's Up (Q1 2026):
    - Open forum for customers and/or interested parties to learn about the IRP/CEP, CBIs and the all-source RFP.
    - Designed for accessibility and dialogue with participants.

Ongoing engagement

- Continued outreach and engagement to help drive awareness and knowledge with PGE's customers and communities.



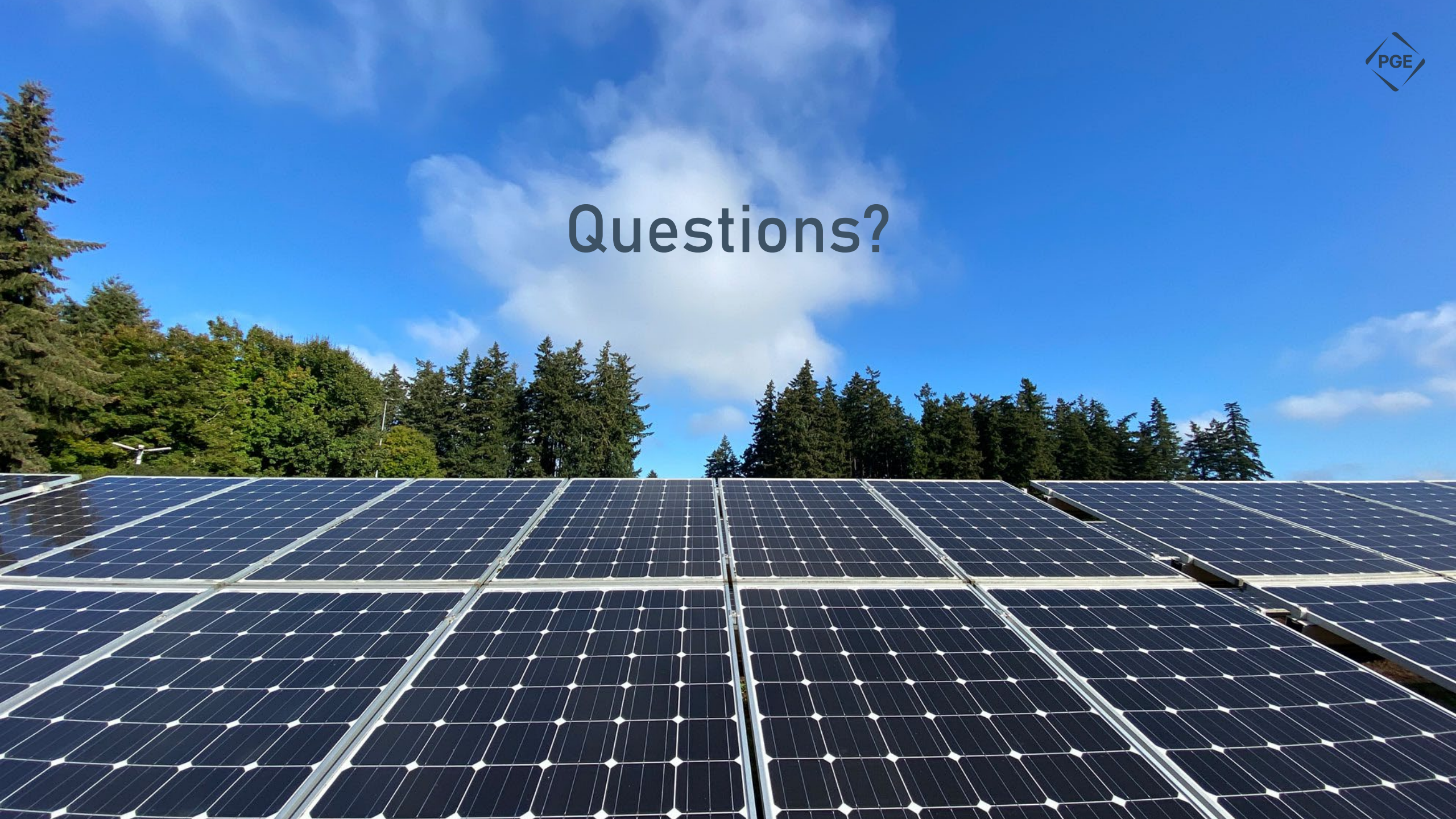
Community Engagement Activity Timeline



Stay Connected in Community

For more information or inquiries, please contact us at **CommunityConnect@pgn.com**.

We look forward to staying connected and continuing this conversation with you!


Questions?

Portfolio/Scenario Design

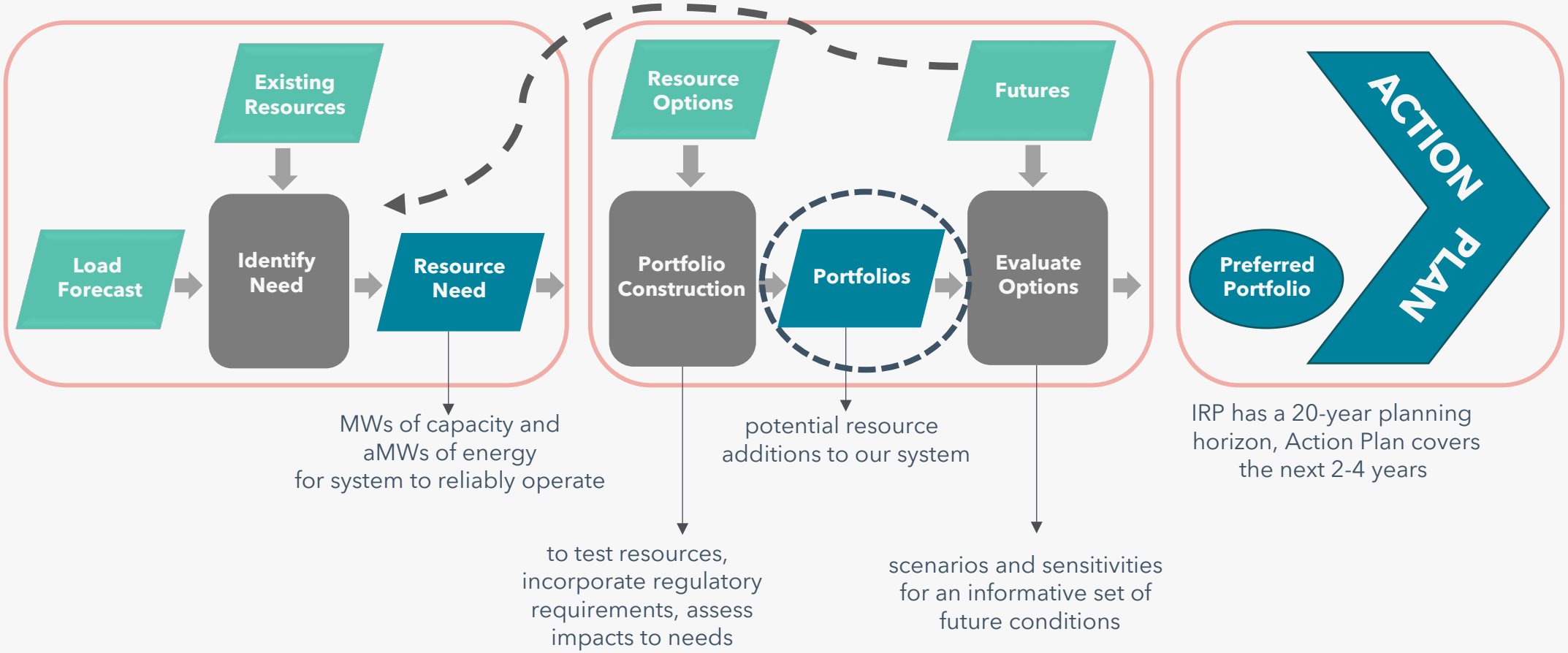
Rob Campbell
Principal Integrated Resource Planning Analyst
Integrated Resource Planning

PGE An Oregon kind of energy.℠

Outline

- Overview of Portfolio Design & Analysis
- Key Portfolio Assumptions
- Portfolio Categories

High-Level IRP Analysis Process



Portfolio Design

The **goal of portfolio analysis** is to inform the creation of a Preferred Portfolio that best balances cost, risk, the pace of decarbonization and community benefits.

The **purpose of portfolio design** is to create a set of portfolios that allow us to gain insights on key questions of interest.

Thoughtful portfolio design:

1. Reasonably captures the realities of a complex long-term planning environment in a simplified modeling exercise.
2. Narrows the focus of analytical effort to key questions of interest.
3. Allows the impacts of alternative decisions to be compared.

Portfolio Analysis Overview

- Portfolio analysis is conducted using PGE's optimized capacity expansion modeling tool, **ROSE-E**.
- A **Portfolio** is a fixed set of resource decisions over a 20-year time horizon, designed to represent the planning environment and test key planning assumptions.
- Portfolios are subject to constraints that ensure incremental resource additions are sufficient to meet energy and capacity needs and comply with regulatory requirements.
- Portfolios are analyzed across a wide range of potential future conditions to capture uncertainty, each combination of which represents a specific **Scenario**.
- For each Scenario, a least cost **Resource Buildout** is produced.

Future Scenarios

Portfolios are designed to meet adequacy needs, subject to transmission and procurement constraints, and are solved across all permutations of price futures, need futures and technology cost futures.

Scenarios capture uncertainty by representing a wide range of future conditions for resource need, electricity price and technology cost.

Future Conditions

- Need – Low, Reference, High
- Price – Load needs, Carbon policies, Gas Price, WECC Resource Buildout
- Technology Cost – Low, Reference, High

[3 Need] x [37 Price] x [3 Tech Cost] = **333 Scenarios**

For every **Portfolio**, a least-cost resource buildout is produced for each of the 333 **Scenarios**.

Key Assumptions in Portfolio Analysis

All portfolios are subject to a default set of assumptions about key analysis parameters. Individual portfolios may alter the default assumptions to test planning questions.

Parameter	Default Assumption

Resource Adequacy	• All portfolios are constrained to meet resource adequacy requirements during all years
	  • Energy needs must be met in every month
	  • Capacity needs must be met in summer and winter of every year
	• Energy and capacity needs must be met by adding new resources

Resource Availability	ROSE-E has the option to select:
	  • Renewables and storage
	  • VPP resources (CE and NCE DERs)[1]
	  • CBREs
	  • NCE EE

Transmission	Off-system renewables must have associated transmission through:
	  1) BPA ATC, or
	  2) Transmission expansion (and associated costs), or
	  3) Transmission upgrade (and associated costs)

Renewable Portfolio Standard (RPS)	Portfolios must comply with RPS obligations

[1] PGE described a proposed new approach to VPP modeling in portfolio analysis at the December 2025 Roundtable.

Portfolio Categories

Portfolio analysis is designed to answer key questions in resource planning and leverage insights from those answers in the selection of the Preferred Portfolio. These questions will be explored through different portfolio categories (i.e., scenarios):

Portfolio Category	Description
HB 2021 80% Emissions Reductions	• Thermal resources that are retained to serve retail load will decline along a linear glidepath. • No additional natural gas resources can be added.
Reliability Only	• Not subject to HB 2021 emissions constraints. • Additional natural gas resources are available for selection, representing potential new contracts.
No Large Load Growth	• Resources are added to meet organic load-growth only. • Exclude growth associated with Schedule 96 (data centers).
Contract Scenarios	• Test the impact of additional acquiring energy and capacity through the extension of existing expiring contracts, or execution of new contracts.
HB 2021 Cost Cap	• **New for 2026 IRP** – details on next slide.

HB 2021 Cost Cap

House Bill 2021 contains a "cost cap" provision that allows for a temporary deferral of compliance with emissions reduction targets if complying would increase rates by more than 6%.[1]

The 2026 CEP/IRP will include a portfolio category aimed at estimating the cost, resource need, and emissions impacts of triggering the cost cap provision. The Cost Cap portfolio category requires a two-step analysis in ROSE-E:

Step 1 – Establish a cost cap: equal to a 6% annual increase in costs relative to a Reliability Only Portfolio. This includes the costs of PGE's existing resources + incremental additions from ROSE-E.[2]

Step 2 – Run ROSE-E with the same assumptions as the Reliability Only Portfolio and include a constraint requiring the model to spend the cost cap amount on HB 2021-compliant non-emitting resources in each year, beginning in 2030.

The resulting portfolio buildout **meets reliability needs and makes incremental progress towards emissions reductions targets** without being constrained to comply with an emissions reduction glidepath.

[1] Oregon House Bill 2021, Section 10. Final outcomes may vary depending on regulatory processes.
[2] IRP annual cost estimates are not equivalent to customer rate impacts, which are determined through different regulatory pathways, but can be used to shed light on the planning implications of cost-related impacts.

Summary / Highlights / Next Steps

Portfolio design is being developed to explore planning questions identified as of high importance to PGE and stakeholders.

Next steps for portfolio analysis are to collect and update necessary input data to newest vintages and run portfolios in ROSE-E.

In coming roundtables, portfolio scoring approach and draft results will be shared.

Guided Feedback – Portfolio/Scenario Designs

Process: Do you have any comments or questions regarding PGE's process for designing portfolios and how it informs the selection of a preferred portfolio?

Content: Are PGE's portfolio design assumptions clear? Are there any other assumptions that should be included?

NEXT STEPS

A recording from today's webinar will be available on our website in one week

Upcoming Roundtable: February 24, 2026

Thank you

Contact us at
IRP.CEP@PGN.COM

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ACRONYMS

ARIMA: autoregressive integrated moving average
ART: annual revenue-requirement tool
ATC available transfer capability
BPA: Bonneville Power Administration
C&I: commercial and industrial
CBI: community benefit indicators
CBIAG: community benefits and impacts advisory group
CBRE: community based renewable energy
CDD: colling degree day
CEC: California energy commission
CEP: clean energy plan
CF: conditional firm
DC: direct current
DER: distributed energy resource
DR: demand response
DSP: distribution system plan
EE: energy efficiency
ELCC: effective load carrying capacity
EJ: environmental justice
ETO: energy trust of Oregon
EUI: energy use intensity
GHG: greenhouse gas
HB 2021: House Bill 2021
HDD: heating degree day
HVDC: high-voltage direct current
IE: independent evaluator
IOU: investor-owned utilities
ITE: information technology equipment
ITC: investment tax credit
kW: kilowatt
LOLH: loss of load hours
LT/ST: long term/ short term
LTF: long-term firm
MW: megawatt
MWa: mega watt average
NAICS: North American industry classification system
NCE: non-cost effective
NG: natural gas
NPVRR: net present value revenue requirement
OASIS Open Access Same Time Information System
ODOE: Oregon department of energy
PPA: power purchase agreement
PSH: pumped storage hydro
PUC: public utility commission
PURPA: Public Utility Regulatory Policies Act
PV: photovoltaic
REC: renewable energy credit
RLRR: low carbon price future
ROSE-E: resource option strategy engine
RPS: renewable portfolio standard
RRRR: reference case price future
RTO: regional transmission organization
SoA: South of Allston
T&D: transmission and distribution
TSR: transmission service request
TSEP: TSR study and expansion process
Tx: transmission
UPC: usage per customer
UPS: uninterruptible power supply
VER: variable energy resources
VPP: virtual power plant
WECC: western electricity coordinating council